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|  | |  | | --- | | **Simulation of Shaft\_10x8**  **Date: 02.03.2020 Designer: Solidworks**  **Study name: Frequency 1**  **Analysis type: Frequency** | | Table of Contents  [Description 1](#_Toc34057353)  [Hypothesis 2](#_Toc34057354)  [Model Information 2](#_Toc34057355)  [The example attributes 3](#_Toc34057356)  [Units 3](#_Toc34057357)  [Material 4](#_Toc34057358)  [Load and fixture 4](#_Toc34057359)  [Joint definition 4](#_Toc34057360)  [Contact 5](#_Toc34057361)  [Mesh 6](#_Toc34057362)  [Sensor 7](#_Toc34057363)  [Results 8](#_Toc34057364) | |
| Description No Data |

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| Hypothesis |

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| Model Information  |  |  |  |  |  | | --- | --- | --- | --- | --- | | |  | | --- | |  |   ****Model name:** Shaft\_10x8**  ****Current Configuration:** Default** | | | | | ****Solid Bodies**** | | | | | ****Document Name and Reference**** | ****Treated As**** | ****Volumetric Properties**** | ****Document Path/Date Modified**** | | **Aufsatz-Linear austragen1** | **Solid Body** | ****Mass:0.0727781 kg****  ****Volume:9.33053e-06 m^3****  ****Density:7,800 kg/m^3****  ****Weight:0.713226 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\SW from Rico\Schaft Ra10mm Ri8mm.SLDPRT****  **Feb 27 17:07:01 2020** | | **Rotation3** | **Solid Body** | ****Mass:0.0298954 kg****  ****Volume:3.83274e-06 m^3****  ****Density:7,800 kg/m^3****  ****Weight:0.292975 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\SW from Rico\Stopfen Schaft Lagerung Var2.SLDPRT****  **Feb 27 17:07:00 2020** | | **M5 Gewindebohrung2** | **Solid Body** | ****Mass:0.0123995 kg****  ****Volume:1.58968e-06 m^3****  ****Density:7,800 kg/m^3****  ****Weight:0.121515 N**** | ****C:\Users\sq437\Desktop\Masterarbeit\SW from Rico\Stopfen Schaft Ringschraube Var2.SLDPRT****  **Feb 27 17:07:00 2020** | |

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| The example attributes  |  |  | | --- | --- | | Study name | Frequency 1 | | Analysis type | Frequency | | Mesh type | Solid Mesh | | Number of frequencies | 5 | | Solver type | Automatic | | Soft Spring: | Off | | Incompatible bonding options | Automatic | | Thermal option | Include temperature loads | | Zero strain temperature | 298 Kelvin | | Include fluid pressure effects from SOLIDWORKS Flow Simulation | Off | | Result folder | SOLIDWORKS document (C:\Users\sq437\Desktop\Masterarbeit\SW from Rico) | |

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| Units  |  |  | | --- | --- | | Unit system: | SI (MKS) | | Length/Displacement | mm | | Temperature | Kelvin | | Angular velocity | Rad/sec | | Pressure/Stress | N/m^2 | |

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| Material  |  |  |  | | --- | --- | --- | | ****Model Reference**** | ****Properties**** | ****Components**** | |  | |  |  | | --- | --- | | ****Name:**** | **1.0114 (S235J0)** | | ****Model type:**** | **Linear Elastic Isotropic** | | ****Default failure criterion:**** | **Max von Mises Stress** | | ****Yield strength:**** | **2.35e+08 N/m^2** | | ****Tensile strength:**** | **3.6e+08 N/m^2** | | ****Mass density:**** | **7,800 kg/m^3** | | ****Elastic modulus:**** | **2.1e+11 N/m^2** | | ****Poisson's ratio:**** | **0.28** | | ****Thermal expansion coefficient:**** | **1.1e-05 /Kelvin** | | **SolidBody 1(Aufsatz-Linear austragen1)(Schaft Ra10mm Ri8mm-2),**  **SolidBody 1(Rotation3)(Stopfen Schaft Lagerung Var2-2),**  **SolidBody 1(M5 Gewindebohrung2)(Stopfen Schaft Ringschraube Var2-2)** | | **Curve Data:N/A** | | | |

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| Load and fixture  | ****Fixture name**** | ****Fixture Image**** | ****Fixture Details**** | | --- | --- | --- | | **Fixed-1** |  | |  |  | | --- | --- | | Entities: | **1 face(s)** | | Type: | **Fixed Geometry** | | |

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| Joint definition No Data |

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| Contact  | Contact | Contact Image | Contact Properties | | --- | --- | --- | | Global Contact |  | |  |  | | --- | --- | | Type: | **Bonded** | | Components: | **1 component(s)** | | Options: | **Compatible mesh** | | |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Mesh  |  |  | | --- | --- | | Mesh type | Solid Mesh | | Mesher Used: | Standard mesh | | Automatic Transition: | Off | | Include Mesh Auto Loops: | Off | | Jacobian points | 4 Points | | Element Size | 1.4785 mm | | Tolerance | 0.0739252 mm | | Mesh Quality Plot | High | | Remesh failed parts with incompatible mesh | Off |  Mesh information - Details  |  |  | | --- | --- | | Total Nodes | 68795 | | Total Elements | 37825 | | Maximum Aspect Ratio | 27.818 | | % of elements with Aspect Ratio < 3 | 99.3 | | % of elements with Aspect Ratio > 10 | 0.0291 | | % of distorted elements(Jacobian) | 0 | | Time to complete mesh(hh;mm;ss): | 00:00:10 | | Computer name: | QX2021 | |  | | |

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| Sensor No Data |

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| Results  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude1 | AMPRES: Resultant Amplitude Plot for Mode Shape: 1(Value = 68.1382 Hz) | 0.000e+00  Node: 52479 | 6.062e+00  Node: 63324 | | **Shaft\_10x8-Frequency 1-Amplitude-Amplitude1** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude2 | AMPRES: Resultant Amplitude Plot for Mode Shape: 2(Value = 68.1411 Hz) | 0.000e+00  Node: 52479 | 6.062e+00  Node: 63374 | | **Shaft\_10x8-Frequency 1-Amplitude-Amplitude2** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude3 | AMPRES: Resultant Amplitude Plot for Mode Shape: 3(Value = 461.529 Hz) | 0.000e+00  Node: 52479 | 5.305e+00  Node: 12995 | | **Shaft\_10x8-Frequency 1-Amplitude-Amplitude3** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude4 | AMPRES: Resultant Amplitude Plot for Mode Shape: 4(Value = 461.552 Hz) | 0.000e+00  Node: 52479 | 5.305e+00  Node: 25223 | | **Shaft\_10x8-Frequency 1-Amplitude-Amplitude4** | | | |  | Name | Type | Min | Max | | --- | --- | --- | --- | | Amplitude5 | AMPRES: Resultant Amplitude Plot for Mode Shape: 5(Value = 1,324.23 Hz) | 0.000e+00  Node: 52479 | 5.561e+00  Node: 27888 | | **Shaft\_10x8-Frequency 1-Amplitude-Amplitude5** | | | |   **Mode List**   | ****Frequency Number**** | ****Rad/sec**** | ****Hertz**** | ****Seconds**** | | --- | --- | --- | --- | | **1** | **428.13** | **68.138** | **0.014676** | | **2** | **428.14** | **68.141** | **0.014675** | | **3** | **2,899.9** | **461.53** | **0.0021667** | | **4** | **2,900** | **461.55** | **0.0021666** | | **5** | **8,320.4** | **1,324.2** | **0.00075516** |   **Mass Participation (Normalized)**   | ****Mode Number**** | ****Frequency(Hertz)**** | ****X direction**** | ****Y direction**** | ****Z direction**** | | --- | --- | --- | --- | --- | | **1** | **68.138** | **0.28296** | **0.18177** | **2.1906e-14** | | **2** | **68.141** | **0.18176** | **0.28295** | **1.9175e-13** | | **3** | **461.53** | **0.080969** | **0.054225** | **2.4261e-12** | | **4** | **461.55** | **0.054223** | **0.080966** | **7.6146e-12** | | **5** | **1,324.2** | **0.028153** | **0.020146** | **7.8277e-12** | |  |  | **Sum X = 0.62807** | **Sum Y = 0.62006** | **Sum Z = 1.8082e-11** | |